

# United States Patent [19]

Hansen et al.

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## [54] CUSTOMER PROGRAMMABLE REAL-TIME SYSTEM

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[58] Field of Search ..... 379/94, 90, 93, 96, 379/97, 98; 364/200

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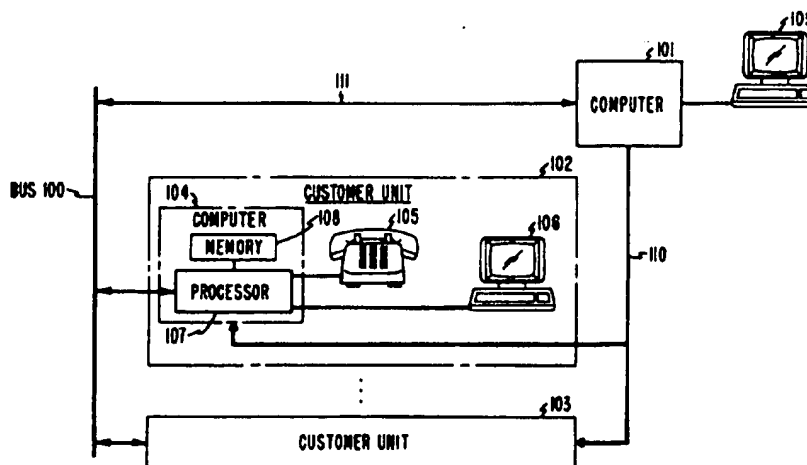
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## [57] ABSTRACT

A telecommunication and development system for the switching of voice and data under computer control in a customer programmable environment that allows real-time modification of communication services. The computer program controlling the system is written in a nonprocedural language that allows for the direct control of the telecommunication system on the basis of state definition, event definition, and action definition. Program scripts define a particular feature, and each script consists of a plurality of triples that automatically respond to the system state and signal information to execute the necessary actions to provide part of a feature to the telecommunication system. During provision of telecommunication services, a customer can add new features that not only add new operations to the system, but modify existing operations without interfering with the present operation of the system. This is possible since the nonprocedural language allows for the direct control of interaction between features and provides for the automatic execution of required operations during state transitions. In addition, the nonprocedural language allows a feature or script to control its own deactivation or activation. Also, the software development environment is based on a standard operating system allowing for ease of development. The above features allow a customer to program his or her own individual communication unit to provide desired features without affecting the operation of the telecommunication system or the features provided to other customers.

36 Claims, 35 Drawing Sheets



- [54] CONTROL OF REAL-TIME SYSTEMS  
UTILIZING A NONPROCEDURAL  
LANGUAGE
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- [73] Assignee: American Telephone and Telegraph Company and AT&T Bell Laboratories, Murray Hill, N.J.
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[57] ABSTRACT

A telecommunication system for the switching of voice and data controlled by a computer executing a non-procedural language that allows for the explicit control of interaction between features by the program scripts executing the programs. The program scripts are written in the nonprocedural language that allows for a state definition, an event definition, and an operation definition. The triples automatically respond to the system state and system signal to execute the necessary actions to control the telecommunication system. During the run time of the system, a script whose triples implement a particular feature can control whether or not features of lower precedence are allowed to be implemented by determining whether or not allow the continuation of the processing of the system signals to the scripts of lesser precedence. In addition, a script can control its own deactivation until later conditions are met that allow the deactivation of the script.

32 Claims, 39 Drawing Figures

